
AI at Scale
ACTIVEEON
SCALE BEYOND LIMITS

# Speaker

Andrews CORDOLINO SOBRAL - andrews.sobral@activeeon.com

Ph.D. on Computer Vision and Machine Learning

Senior AI Research Engineer, Machine Learning Team Leader at ActiveEon, Paris Office

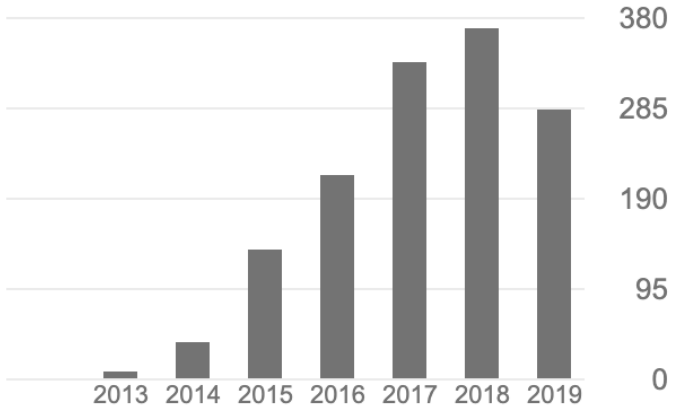
15+ years of software development experience (8+ companies)

20+ scientific publications

70+ reviews on 20+ scientific journals

Google Scholar November, 2019

| | All | Since 2014 |
|---|---|---|
| Citations | 1414 | 1395 |
| h-index | 16 | 16 |
| i10-index | 17 | 17 |




## Ph.D. Thesis

**"Robust low-rank and sparse decomposition for moving object detection: from matrices to tensors"**

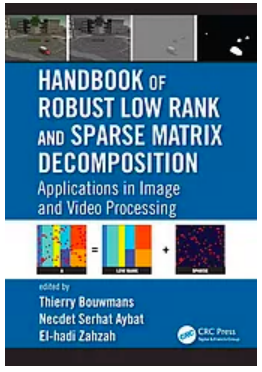
## Education

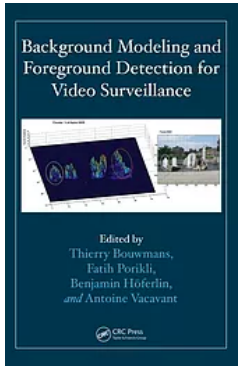
**2013 - 2017** Ph.D. in Computer Vision and Machine Learning at **University of La Rochelle (L3I/MIA)**, France.
**2014 and 2015 (2 x 3 months)** Doctoral research stage at **Computer Vision Center (CVC)**, Barcelona, Spain.
**2010 - 2012** M.Sc. in Mechatronics Engineering at **Federal University of Bahia (Polytechnic School)**, Brazil.
**2004 - 2009** B.Sc. in Computer Engineering at **AREA1 Engineering School**, Brazil.

**Main research interests**
*Computer Vision, Image Processing, Machine Learning, Deep Learning, Matrix & Tensor Decomposition and Factorization, Applied Mathematics, and Optimization.*

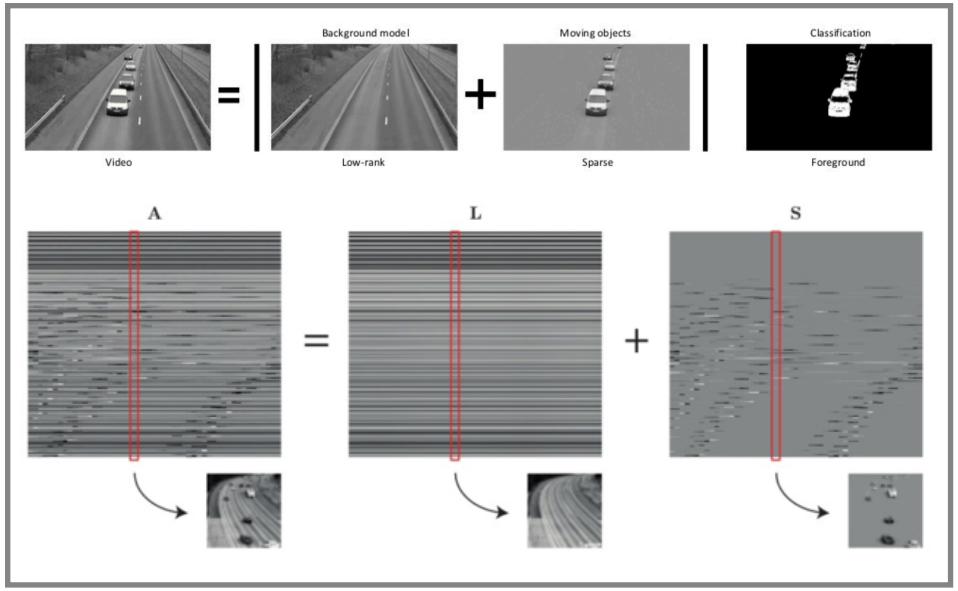
**Programming skills**
*C/C++, Python, MATLAB*

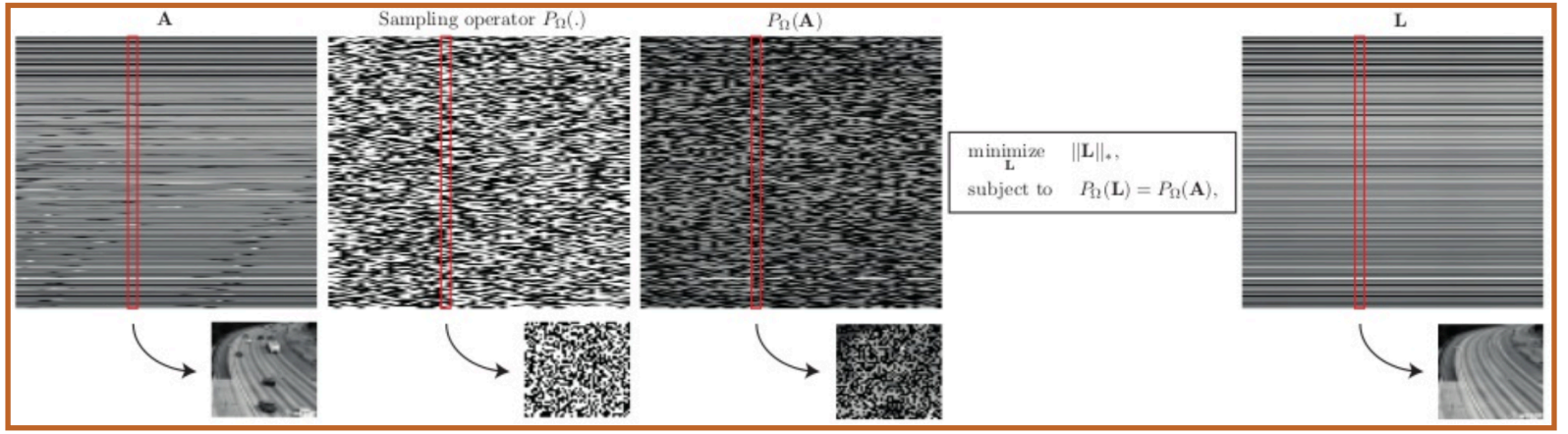
**Links**
*http://andrewssobral.wixsite.com/home*
*https://github.com/andrewssobral*
*https://twitter.com/andrewssobral*
*https://www.linkedin.com/in/andrewssobral*

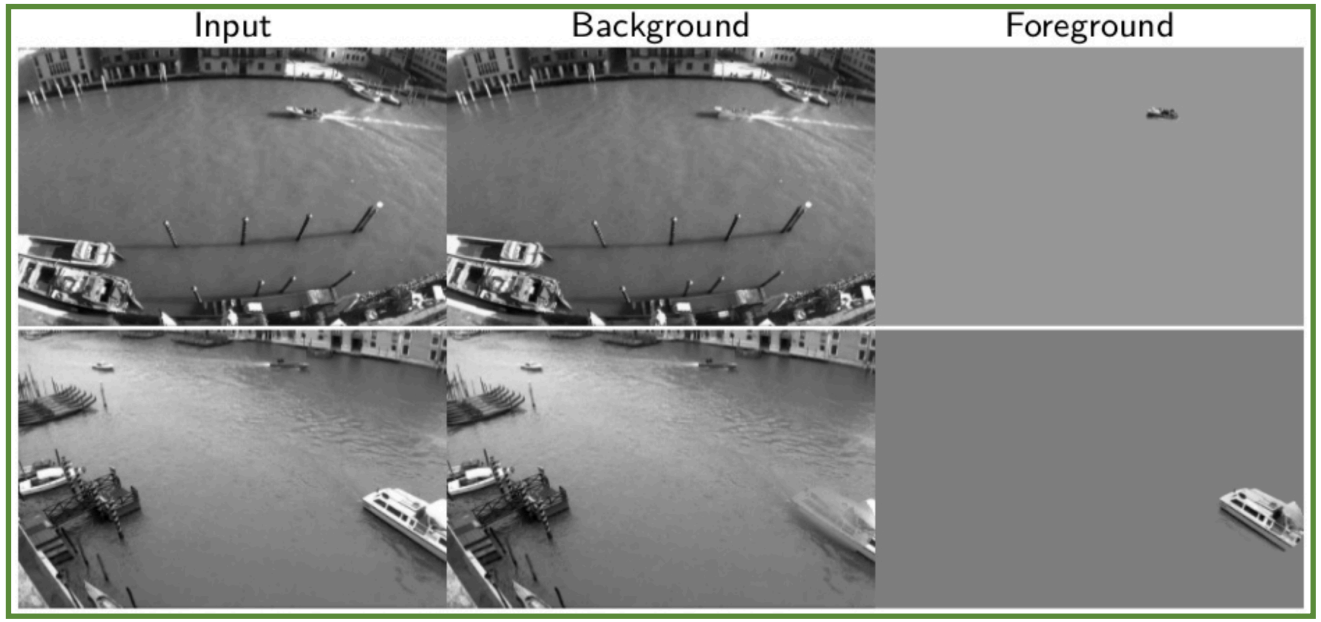


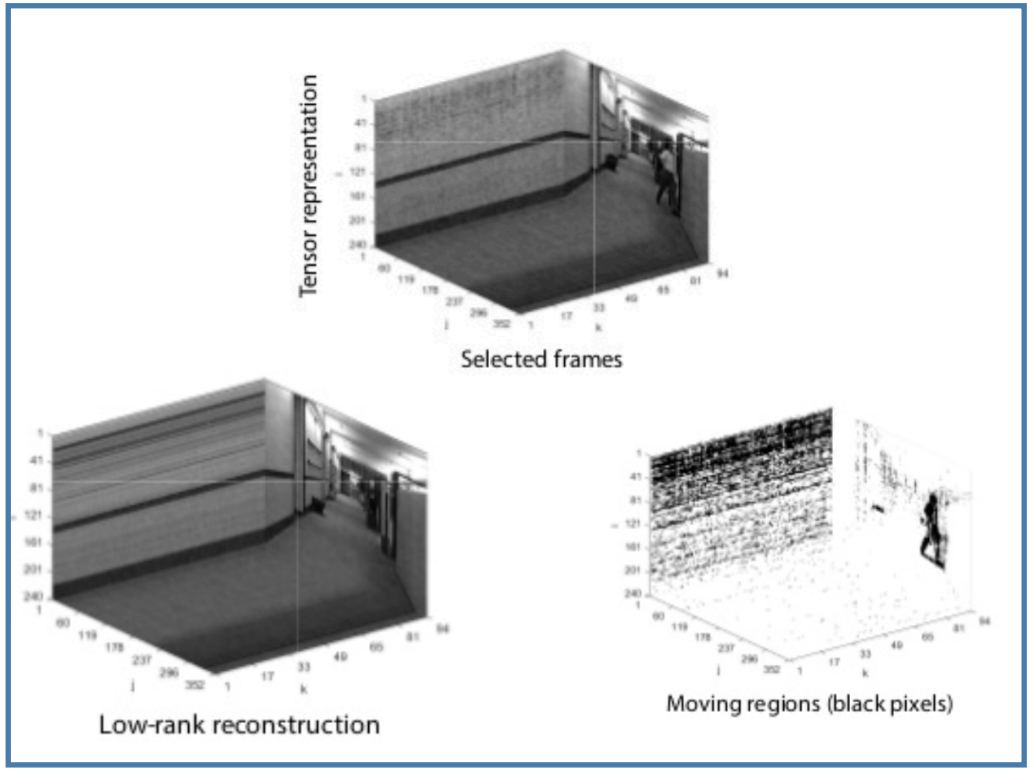



# Decomposition into low-rank + sparse components



# Activeeon Story

Denis Caromel, CEO and Founder

**2005** **An R&D Team of 45 persons headed by Denis Caromel** developing a Core Kernel for Distributed, Parallel & Cloud at INRIA (largest EU Computer Science Research Institute, 6000+ members).

**2007** **Foundation of ActiveEon**
Co-development between INRIA Team & ActiveEon
IP Technology Transfer from INRIA to ActiveEon

**2009** **Scheduler added to the Core**

**2011** **Resource Manager added**

**2013** **Orchestration with Powerful Workflows added**

**2014** **First very large customer references in Production**

**2016 2017** **International Expansions in UK, USA, Africa**

**2018** **Machine Learning Open Studio (MLOS) added to the ProActive Suite**

**2019** **New features added to MLOS: AutoML, Jupyter Kernel, Job Analytics, MaaS**

## Locations

Sophia-Antipolis (France)
Paris (France)

# 2 products

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## PROACTIVE WORKFLOWS & SCHEDULING

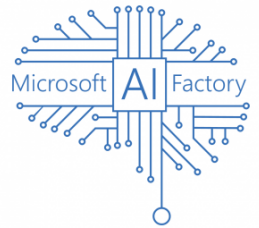
For Gartner identified market of
"*Workload automation and job scheduling, including Big Data/ETL*".









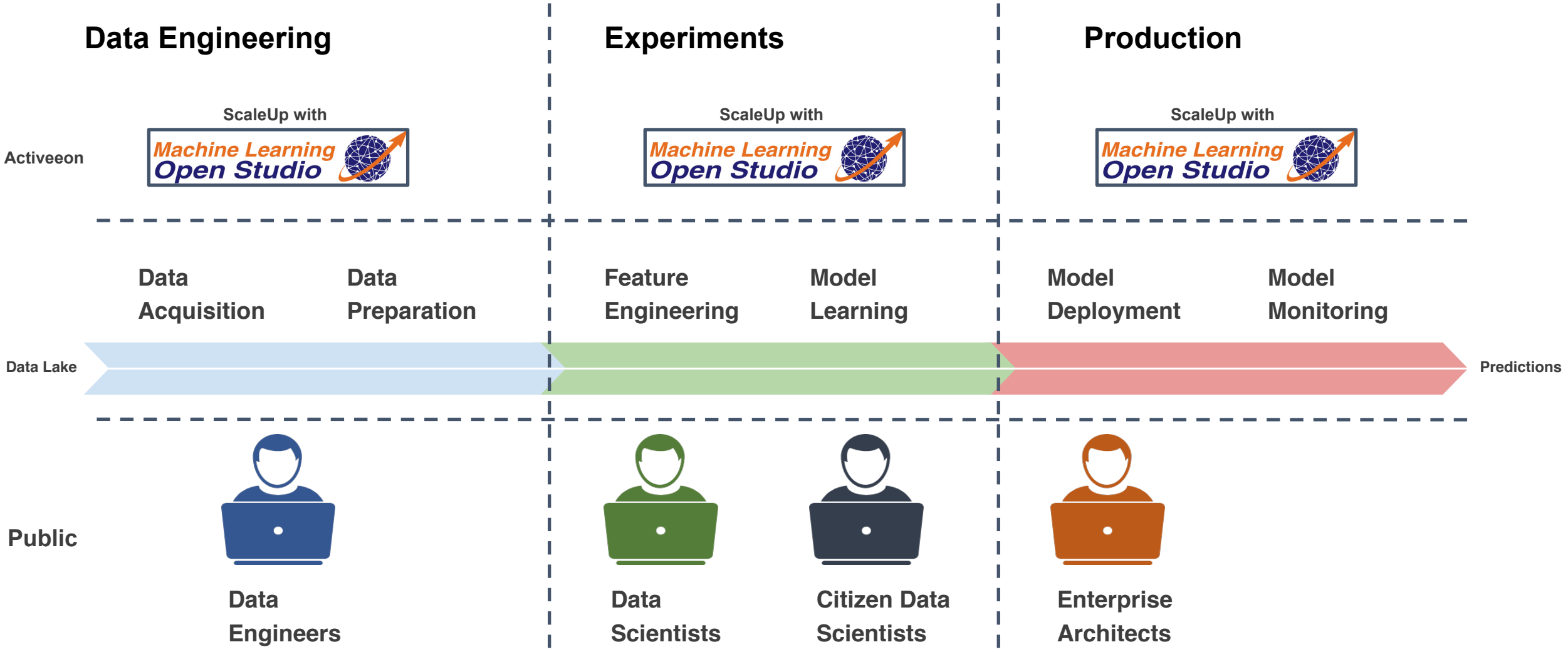

## MACHINE LEARNING OPEN STUDIO

For Gartner identified market of
"*Data Science and Machine Learning Platforms*".

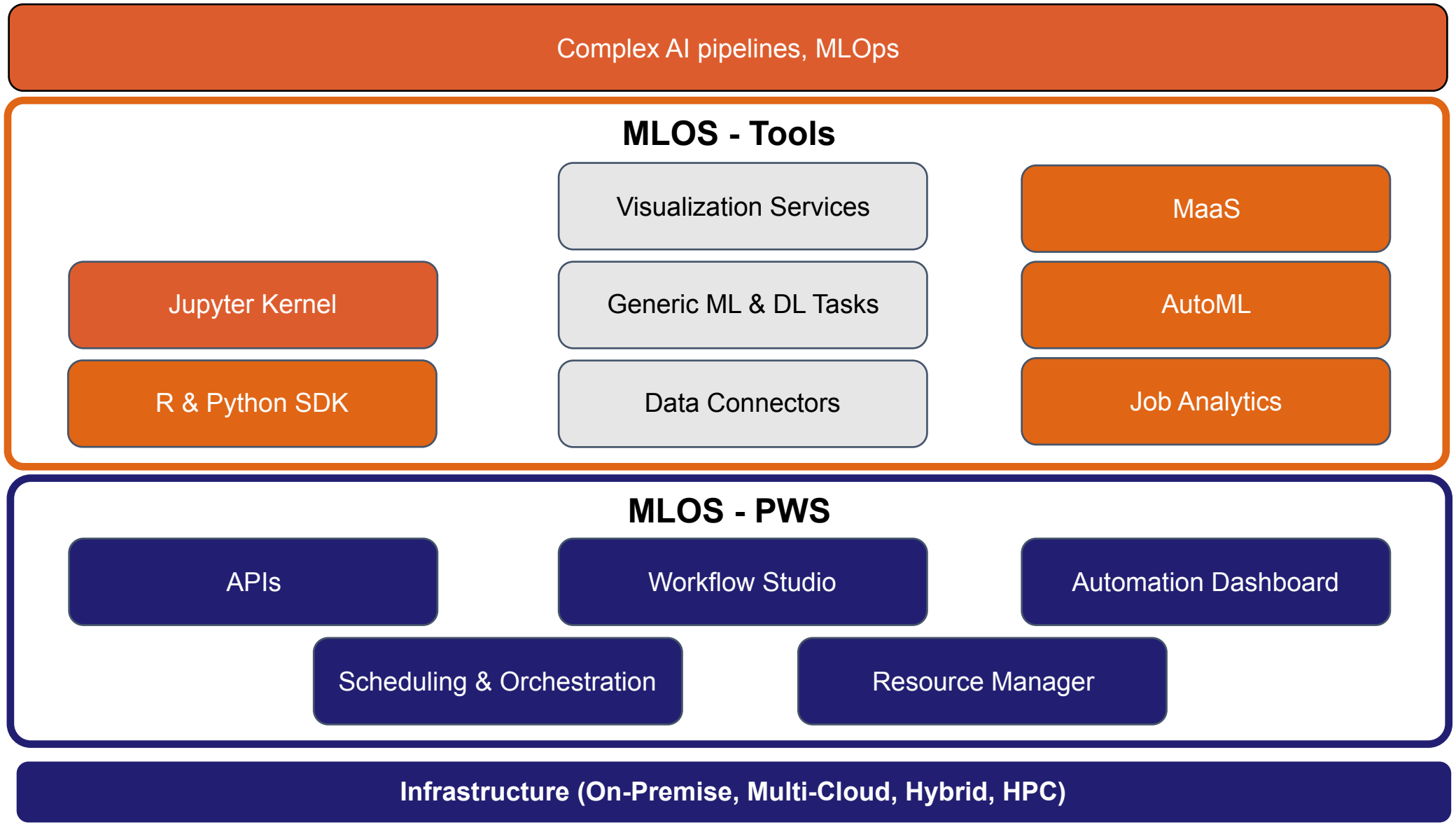



CIAR

# Activeeon Solution Platform for AI



# The MLOS Suite



# MLOS - PWS, the core of the platform

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Open REST API

## Processing & Automation Workflows

Any Language

Secured Data Transfers

Third-part Schedulers

Market ETL, ERP...

Services Chaining & Integration

Translator

## Scheduler & Orchestration

Priority & Planning

Parallel Executions

Error Management

Multi Users

## Resource Management & Monitoring

Multi Platforms

Local machine

Network Resources

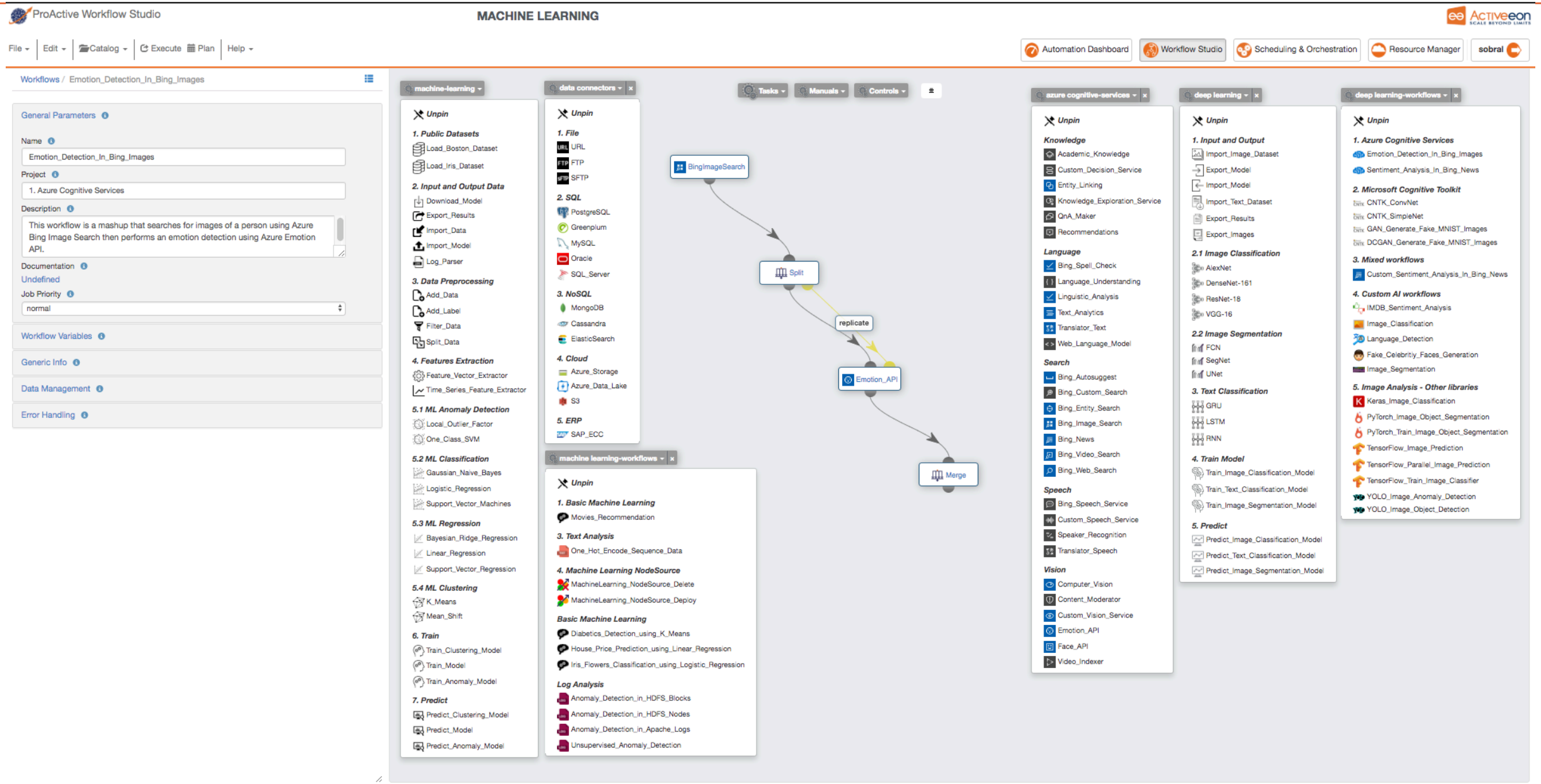
Batch Schedulers

Slurm PBS SGE LSF

Clouds

# MLOS : Workflows Studio

User interface



# MLOS : Parallel & Distributed Training

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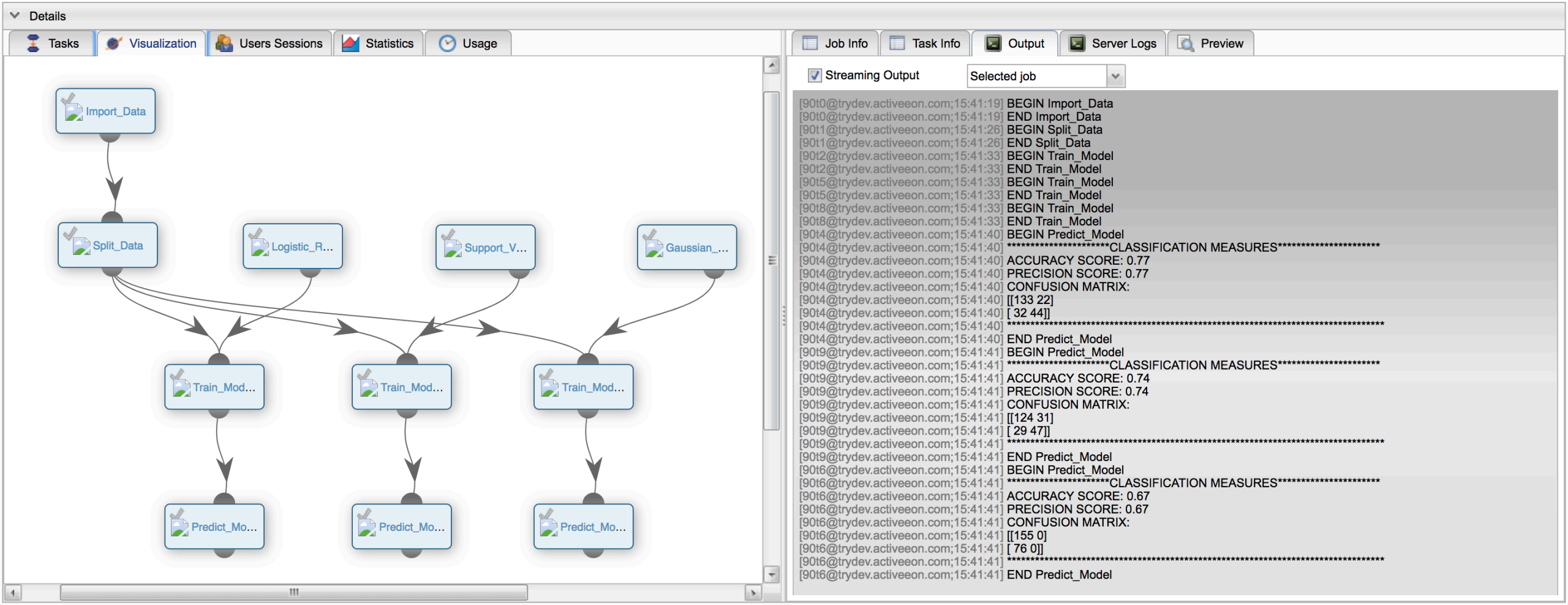

PRODUCT

# MLOS for AI Experts

# MLOS : Python SDK

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```
$ pip install proactive
```

```python
import proactive

gateway = proactive.ProActiveGateway(...)
gateway.connect(username, password)

proactive_task = gateway.createPythonTask()
proactive_task.setTaskName("SimplePythonTask")
proactive_task.setTaskImplementationFromFile("main.py")

job_id = gateway.submitJob(proactive_job)
job_result = gateway.getJobResult(job_id)
print(job_result)
```

https://github.com/ow2-proactive/proactive-python-client

# MLOS : Jupyter Kernel

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jupyter proactive-test Last Checkpoint: 05/29/2019 (autosaved) Logout

File Edit View Insert Cell Kernel Widgets Help Trusted ProActive

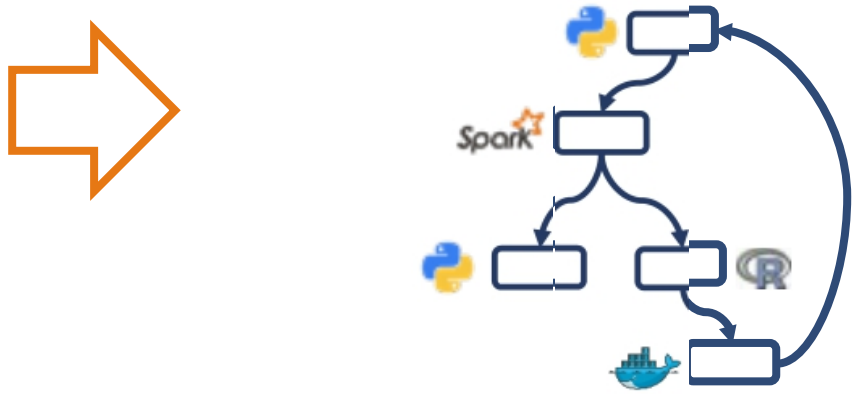
Run Code

```
In [1]: #%connect(path=./proactive_config.ini)

WARNING: Proactive is already connected.
Disconnecting from server: http://try.activeeon.com:8080 ...
Connecting to server ...
Connected as 'narbais'!

In [2]: #%job(name=MyFirstWfFromJupyter)

Creating a proactive job ...
Job 'MyFirstWfFromJupyter' created.
Adding the created tasks to 'MyFirstWfFromJupyter' ...
Done.

In [3]: #%task(name=HelloFromJupyter)

print('Hello from Jupyter Lab!!!')

Creating a proactive 'Python' task ...
Task 'HelloFromJupyter' created.
Adding default selection script to the proactive task ...
Done.

In [4]: #%task(name=dummy, dep=[HelloFromJupyter], export=[var1, var2])

print('dummy task')

Creating a proactive 'Python' task ...
Task 'dummy' created.
Adding default selection script to the proactive task ...
Dependence 'HelloFromJupyter'==>'dummy' added.
Done.
```

Integrate in CI / CD pipelines

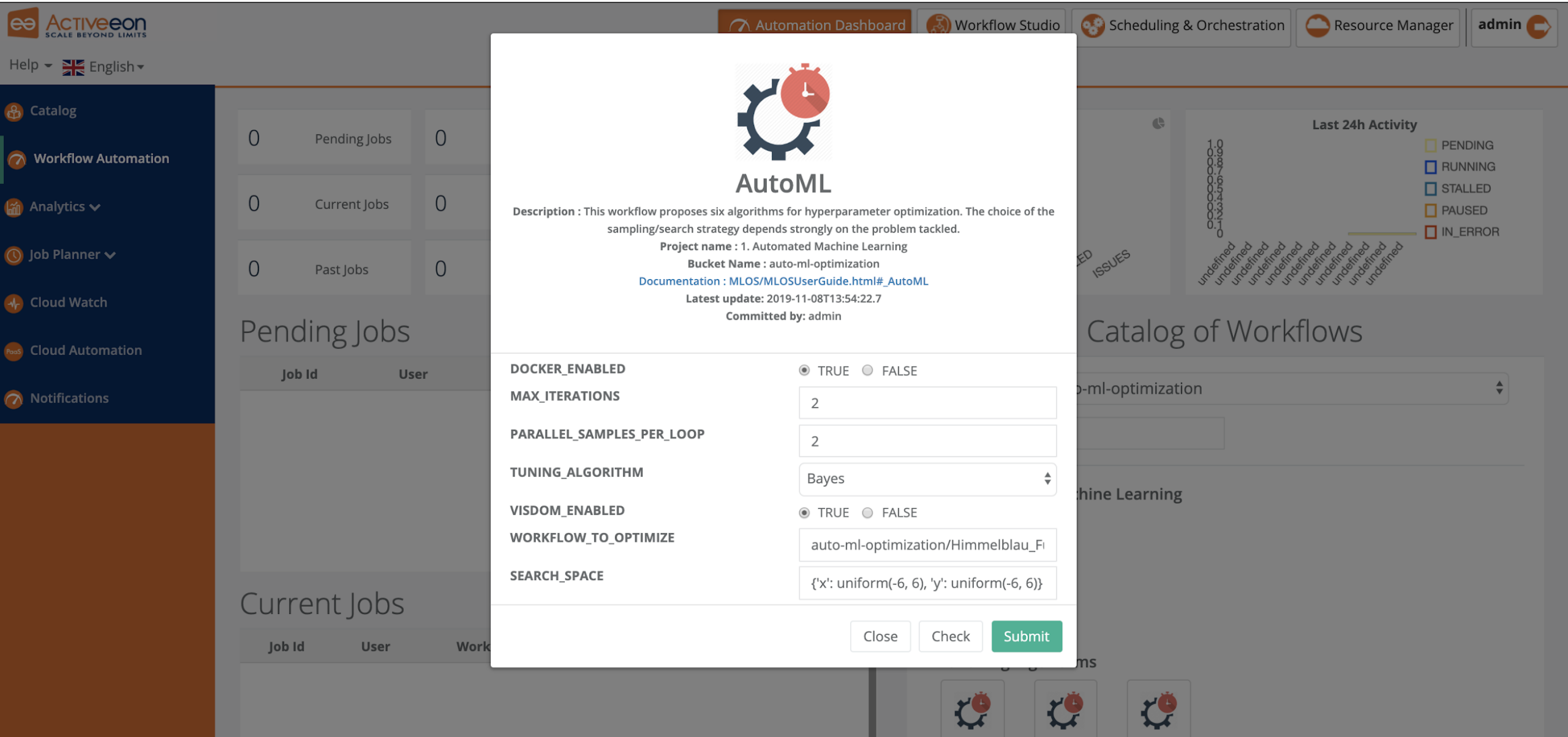
workflow as code
within data scientist environment

Reduce opex expenditures with integrated production migration




migrate from dev to prod seamlessly

# MLOS : AutoML, AutoDL, HyperOpt



# MLOS : Job Analytics

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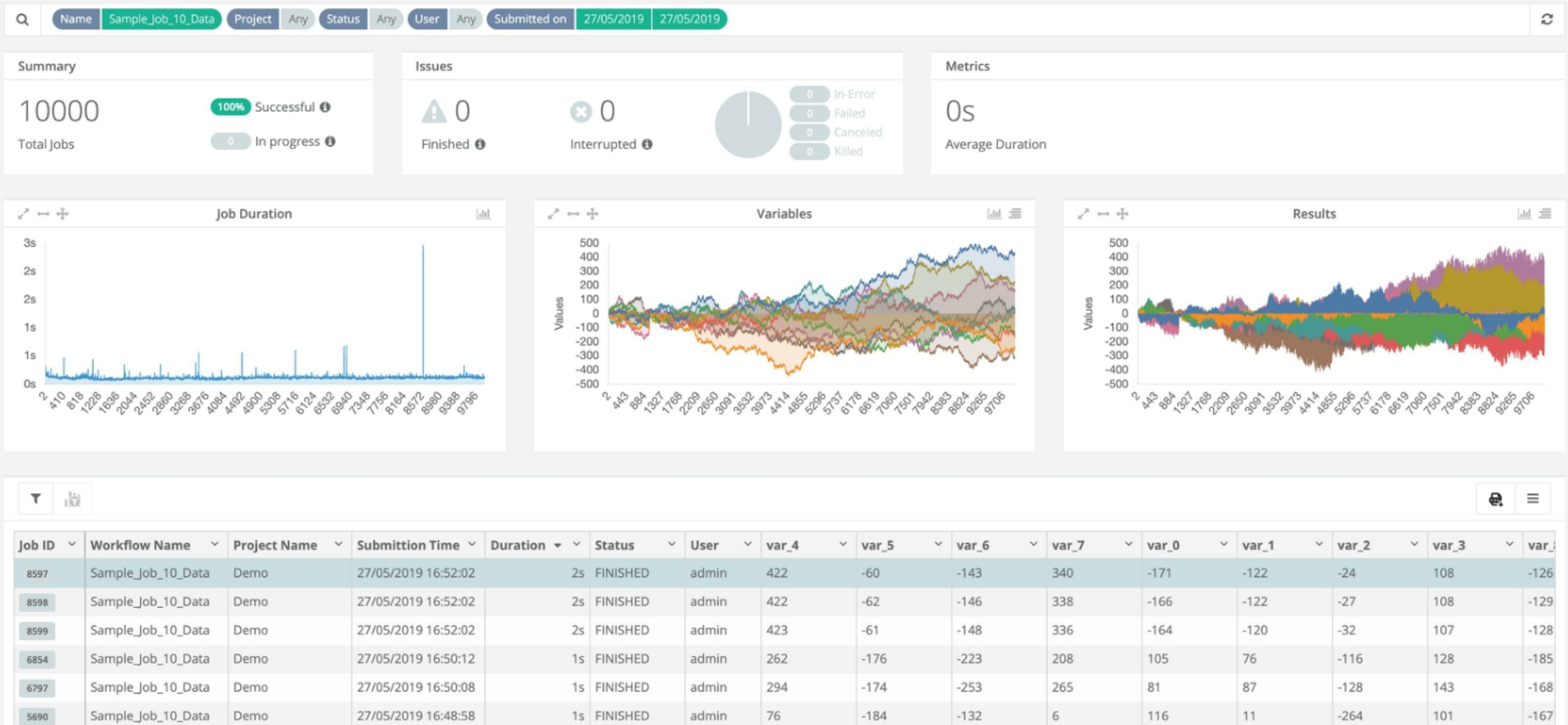
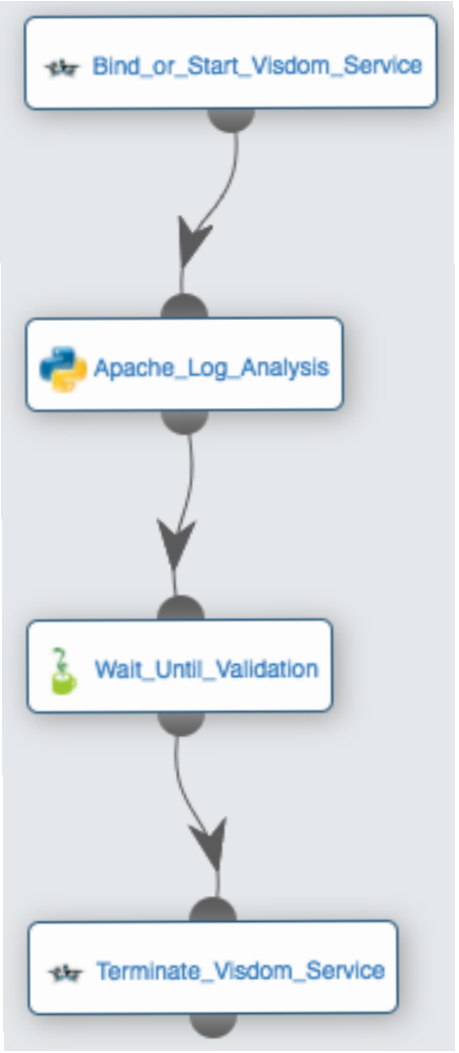
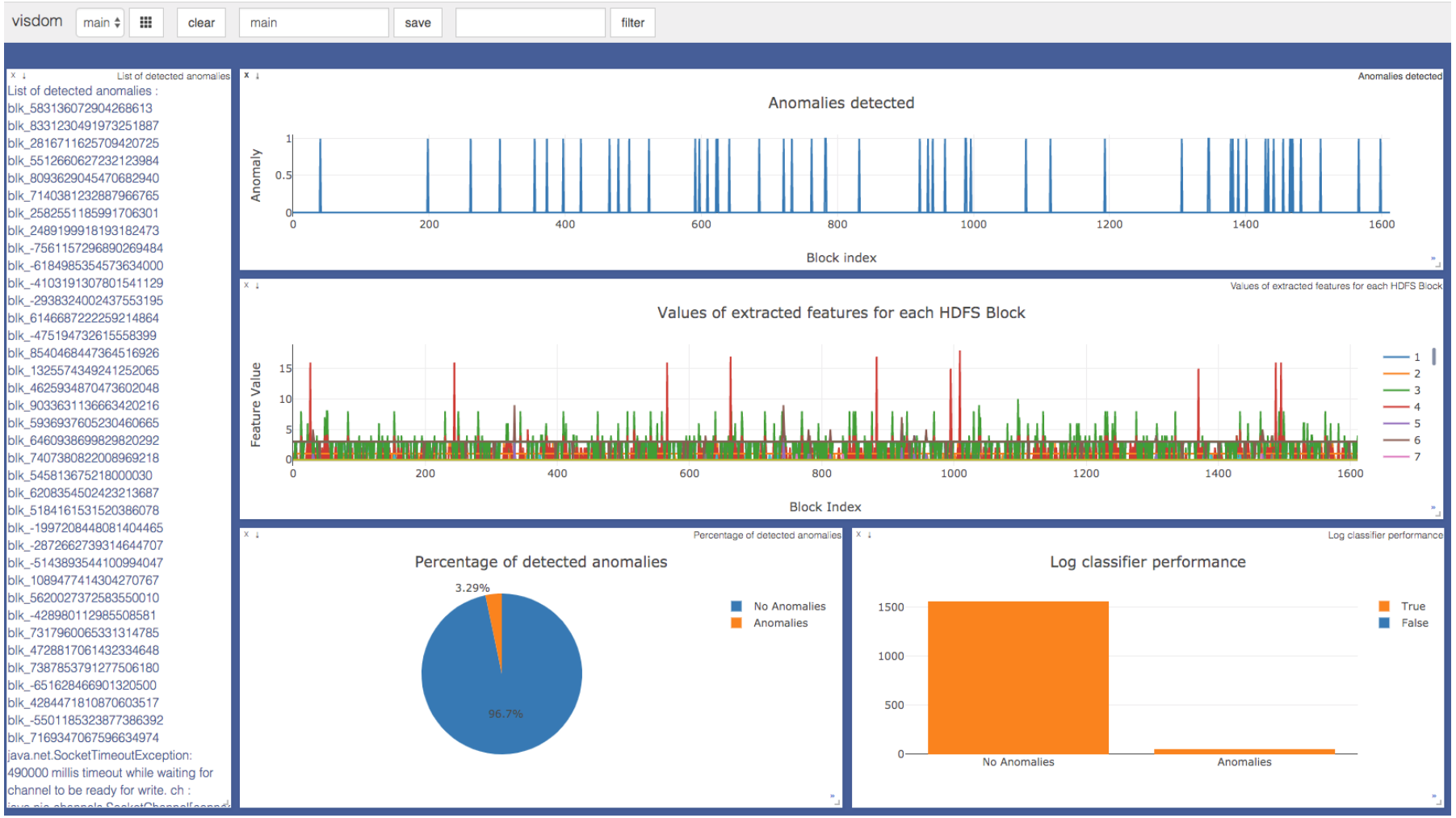



| Job ID | Workflow Name | Project Name | Submittion Time | Duration | Status | User | var_4 | var_5 | var_6 | var_7 | var_0 | var_1 | var_2 | var_3 | var_ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8597 | Sample_Job_10_Data | Demo | 27/05/2019 16:52:02 | 2s | FINISHED | admin | 422 | -60 | -143 | 340 | -171 | -122 | -24 | 108 | -126 |
| 8598 | Sample_Job_10_Data | Demo | 27/05/2019 16:52:02 | 2s | FINISHED | admin | 422 | -62 | -146 | 338 | -166 | -122 | -27 | 108 | -129 |
| 8599 | Sample_Job_10_Data | Demo | 27/05/2019 16:52:02 | 2s | FINISHED | admin | 423 | -61 | -148 | 336 | -164 | -120 | -32 | 107 | -128 |
| 6854 | Sample_Job_10_Data | Demo | 27/05/2019 16:50:12 | 1s | FINISHED | admin | 262 | -176 | -223 | 208 | 105 | 76 | -116 | 128 | -185 |
| 6797 | Sample_Job_10_Data | Demo | 27/05/2019 16:50:08 | 1s | FINISHED | admin | 294 | -174 | -253 | 265 | 81 | 87 | -128 | 143 | -168 |
| 5690 | Sample_Job_10_Data | Demo | 27/05/2019 16:48:58 | 1s | FINISHED | admin | 76 | -184 | -132 | 6 | 116 | 11 | -264 | 101 | -167 |

# MLOS : Visualization Services



# MLOS : Supported technologies

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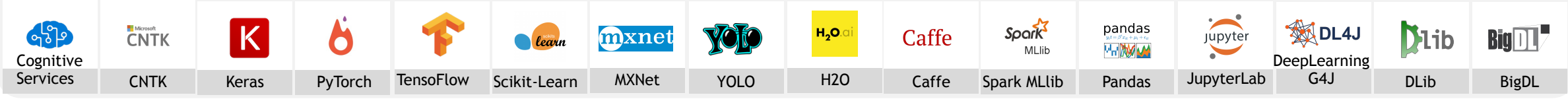
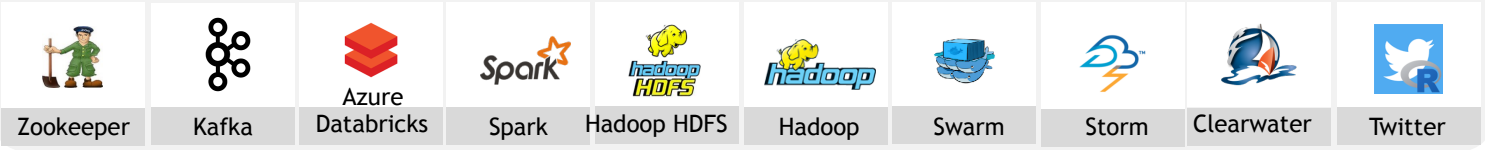
## Machine Learning & Artificial Intelligence



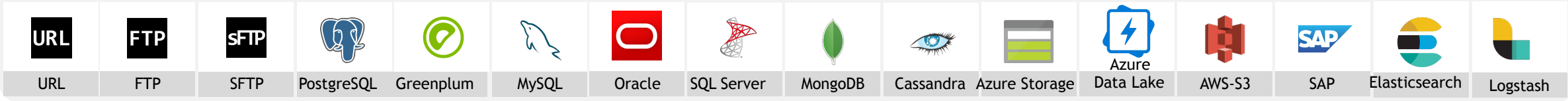

## Big Data



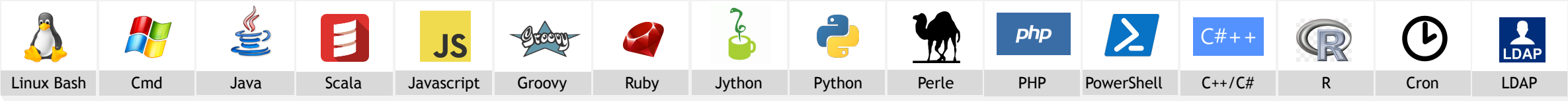

## Specialized


## Visualization


## Data Connectors

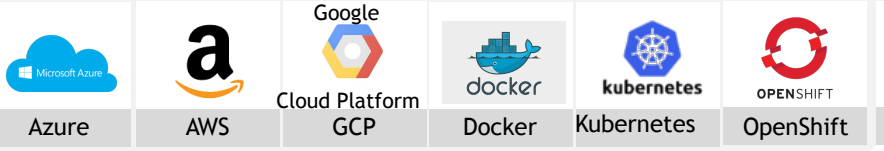



## Languages and Predefined Tasks




## Infrastructure


## Clouds




## HPC Schedulers

# Machine Learning Industrialization

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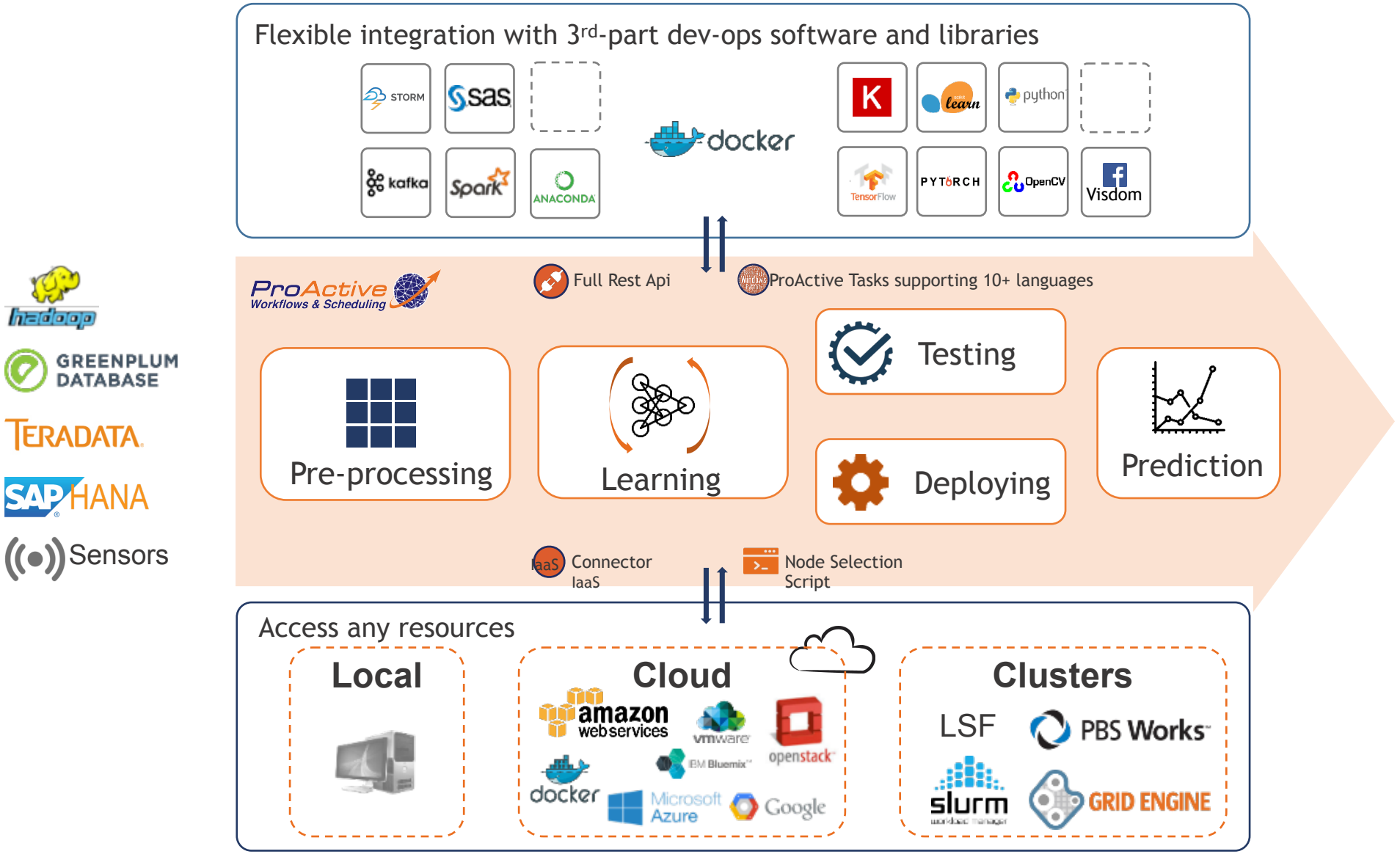


Thank you
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